D Y PATIL UNIVERSITY
RAMRAO ADIK INSTITUTE OF TECHNOLOGY
NAVI MUMBAI

Examination: SE Semester- I_ Internal Assessment – II EVEN SEMESTER
(PROBLEM SOLVING METHOD)

Course Code: **CSC406** Course Name: Operations Research

Duration: 1 hr. Date: 20/04/2022 Max. Marks: 20

Instructions for the Students:- All the Questions are compulsory and carry equal marks .

Q 1	**Solve any Two** **5 marks each**	**BT**	**CO**
i.	*The utility data for a network are given below. Determine the total, free, independent and interfering floats and identify the critical path.* *Activity : 0-1 1-2 1-3 2-4 2-5 3-4 3-6 4-7 5-7 6-7* *Duration : 2 8 10 6 3 3 7 5 2 8*	BT 4	CO 4
ii.	*A stockist has to supply 12,000 units of a product per year to his customer. The demand is fixed and known and the shortage cost is assumed is to be infinite. The inventory holding cost is ₹ 0.20 per unit per month and the ordering cost per order is ₹ 350. Determine* *(i) The optimum lot size q_0* *(ii) optimum scheduling period t_0* *(iii) minimum total variable yearly cost.*	BT 4	CO 5
iii.	*The demand for a commodity is 100 units per day. Every time an order is placed, a fixed cost of ₹ 400 is incurred. Holding cost is ₹ 0.08 per unit per day. If the lead time is 13 days, determine the economic lot size and the reorder point.*	BT 5	CO 5

Q 2	**Solve any One** **10 marks**	**BT**	**CO**
i.	*A self-service store employs one cashier at its counter. Nine customers arrive on an average every 5 minutes while the cashier can serve 10 customers in 5 minutes. Assuming Poisson distribution for arrival rate and exponential distribution for service time, find* *1. Average number of customers in the system.* *2. Average number of customers in the queue or average queue length.* *3. Average time a customer spends in the system.* *4. Average time a customer waits before being served.*	BT 5	CO 6

ii.	Babies are born in a sparsely populated state at the rate of one birth every 12 minutes. The time between births follows an exponential distribution. Find the following: **(a)** The average number of births per year. **(b)** The probability that no births will occur in any one day. **(c)** The probability of issuing 50 birth certificates in 3 hours given that 40 certificates were issued during the first 2 hours of the 3-hour period.	BT 5	CO 6

Course Outcomes (CO) -Learner will be able to:

CO1: Understand OR problem and associated models.

CO2: Understand Linear Programming.

CO3: Use transportation and assignment problems.

CO4: Use PERT for modelling.

CO5: Use Inventory Control System.

CO6: Apply queuing theory and modulation techniques.

Bloom's Taxonomy:

BT1- Remembering, BT2- Understanding, BT3- Applying, BT4- Analyzing, BT5- Evaluating, BT6- Creating